

## 7084167\_1.TXT

## SEQUENCE LISTING

<110> Dale, James Langham  
Echeverria, Santy Peraza

<120> BANANA RESISTANCE GENES AND USES THEREOF

<130> DAVI172.006APC

<140> 10573372

<141> 2006-10-31

<150> PCT/AU2004/001300

<151> 2004-09-23

<150> AU 2003905222

<151> 2003-09-25

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cag acg ttg ctc gac aag gcc agc aac tgc gcg atc caa caa ctc gcg	96
Gln Thr Leu Leu Asp Lys Ala Ser Asn Cys Ala Ile Gln Gln Leu Ala	
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cgg cgc cgc gcc ctt cac gat gac ctg agg cgg ctg cgg acg tct ctg	144
Arg Arg Arg Gly Leu His Asp Asp Leu Arg Arg Leu Arg Thr Ser Leu	
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ctc cgg atc cat gcc atc ctc gac aag gca gag acg agg tgg aac cat	192
Leu Arg Ile His Ala Ile Leu Asp Lys Ala Glu Thr Arg Trp Asn His	
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aaa aac acg agc ttg gtg gag ctg gtg agg cag ctc aag gat gct gcc	240
Lys Asn Thr Ser Leu Val Glu Leu Val Arg Gln Leu Lys Asp Ala Ala	
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Tyr Asp Ala Glu Asp Leu Leu Glu Glu Leu Glu Tyr Gln Ala Ala Lys	
85 90 95	

caa aag gtc gag cac cgg gga gac cag ata agc gac ctc ttt ttt	336
Gln Lys Val Glu His Arg Gly Asp Gln Ile Ser Asp Leu Phe Ser Phe	
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ggg Gly	act Thr 130	cga Arg	ttg Leu	agg Arg	gag Glu	atc Ile 135	cag Gln	ggg Gly	aag Lys	ctg Leu	tgc Cys 140	aac Asn	att Ile	gct Ala	gcc Ala	432
gat Asp 145	atg Met	atg Met	gat Asp	gtc Val	atg Met 150	cag Gln	cta Leu	ttg Leu	gca Ala	ccc Pro 155	gat Asp	gat Asp	ggg Gly	ggg Gly	aga Arg 160	480
caa Gln	ttc Phe	gac Asp	tgg Trp	aag Lys 165	gtg Val	gtg Val	aga Arg	aga Arg	gaa Gln 170	acg Thr	agc Ser	tct Ser	ttc Phe	ttg Leu 175	acc Thr	528
gaa Glu	acc Thr	gtc Val	gtg Val 180	ttt Phe	ggg Gly	cgg Arg	gac Asp	caa Gln 185	gaa Glu	agg Arg	gag Glu	aaa Lys	gta Val 190	gta Val	gaa Glu	576
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ctg Leu	caa Gln	cag Ile 275	atc Ile	ctc Leu	aag Lys	gag Glu	aag Lys 280	att Ile	gct Ala	tca Ser	gag Glu	agg Arg 285	ttt Phe	ctg Leu	cta Leu	864
gtc Val	ctc Leu 290	gat Asp	gat Asp	gtg Val	tgg Trp	agc Ser 295	gaa Glu	aac Asn	agg Arg	gat Asp	gac Asp 300	tgg Trp	gaa Glu	agg Arg	ctg Leu	912
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tgt Cys	gca Ala	ttt Phe 355	ggg Gly	tct Ser	gtg Val	aac Asn	ccc Pro 360	cag Gln	gag Glu	cat His	cta Leu	gag Glu 365	ctc Leu	gag Glu	gtt Val	1104

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Ile Gly Arg Lys Ile Ala Gly Lys Leu Lys Gly Ser Pro Leu Ala Ala	
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Lys Thr Leu Gly Ser Leu Arg Leu Asp Val Ser Gln Glu His Trp	
385 390 395 400	
aga act ata atg gaa agt gag gta tgg caa ctg cca caa gct gaa aat	1248
Arg Thr Ile Met Glu Ser Glu Val Trp Gln Leu Pro Gln Ala Glu Asn	
405 410 415	
gaa ata ttg cct gtt cta tgg ctg agc tat caa cac ctt ccc gga cat	1296
Glu Ile Leu Pro Val Leu Trp Leu Ser Tyr Gln His Lys Asp Gly His	
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Leu Arg Cys Phe Ala Phe Cys Ala Val Phe His Lys Asp Tyr Leu	
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Phe Tyr Lys His Glu Leu Ile Gln Thr Trp Ile Ala Glu Gly Phe Ile	
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gca cat caa gga aac aag agg atg gaa gat gtc gga agc agc tac ttc	1440
Ala His Gln Gly Asn Lys Arg Met Glu Asp Val Gly Ser Ser Tyr Phe	
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His Glu Leu Val Asn Arg Ser Phe Phe Gln Glu Ser Arg Trp Arg Gly	
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cga tat gtg atg cat gac ctc ata cac gat ctt gcc caa ttt ata tca	1536
Arg Tyr Val Met His Asp Leu Ile His Asp Leu Ala Gln Phe Ile Ser	
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Val Gly Glu Cys His Arg Ile Asp Asp Lys Ser Lys Glu Thr Pro	
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Ser Thr Thr Arg His Leu Ser Val Ala Leu Thr Glu Gln Met Lys Leu	
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Val Asp Phe Ser Gly Tyr Asn Lys Leu Arg Thr Thr Leu Met Ile Asn Asn	
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Gln Arg Asn Gln Tyr Pro Tyr Met Thr Lys Val Asn Ser Cys Glu Leu	
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Pro His Ser Leu Phe Lys Arg Leu Lys Arg Ile His Val Leu Val Leu	
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Gln Lys Cys Gly Met Lys Glu Leu Pro Asp Ile Ile Gly Asp Leu Ile	
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	Gly Cys Gln Leu Arg Ser Phe Pro Gln Gly Met Ser Lys Leu Ile Asn	
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	ttg agg caa ctt cgt gta gaa gat gag ata att tcc aag ata tat gag	2016
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	Glu Ala Ser Lys Ala Lys Leu His Arg Lys Gln Tyr Leu Glu Ala Leu	
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	Lys Ser Leu Thr Ile Arg Gly Tyr Ser Gly Ala Thr Val Pro Ser Trp	
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	tgt aca aga ctg gag ggt ctt tca tat att gga caa ctg cca cat ctc	2448
	Cys Thr Arg Leu Gly Leu Ser Tyr Ile Gly Gln Leu Pro His Leu	
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	Lys Val Leu His Met Lys Arg Met Pro Val Val Lys Gln Met Ser His	
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	Glu Leu Cys Gly Cys Thr Lys Ser Glu Leu Phe Pro Arg Leu Glu Glu	
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	tta gta ctg gag gat atg cca aca ttg aaa gaa ttc ccg aat ctt gca	2592
	Leu Val Leu Glu Asp Met Pro Thr Leu Lys Glu Phe Pro Asn Leu Ala	
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aga Arg	aat Asn	ctg Leu	gga Gly	gaa Glu	ggg Gly	ttg Leu	1150	cta Leu	tca Ser	aac Asn	cac His	ctg Leu	1155	cca Pro	cat His	atc Ile	3474
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agg Arg	aac Asn	tgc Cys	ccc Pro	aag Lys	ctc Leu	atg Met	1195	agc Ser	atg Met	aca Thr	cag Gln	tgt Cys	1200	gag Glu	gag Glu	aat Asn	3609
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gta Val	agg Arg	atc Ile	gag Glu	aat Asn	tgt Cys	gat Asp	1270	ggg Gly	ctg Leu	gga Gly	tca Ser	ata Ile	1275	gag Glu	ggt Gly	tta Leu	3834
caa Gln	gtt Val	ctc Leu	aaa Lys	tca Ser	ctc Leu	aag Lys	1285	aga Arg	ttg Leu	gca Ala	atc Ile	ata Ile	1290	gga Gly	tgt Cys	ccc Pro	3879
agg Arg	ctt Leu	ttg Leu	cta Leu	aat Asn	gaa Glu	ggg Gly	1300	gat Asp	gag Glu	caa Gln	ggg Gly	gag Glu	1305	gtc Val	ttg Leu	tca Ser	3924
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Leu	His	Ala	Leu	Val	Val	Ser	Asp	Cys	Pro	Gln	Thr	Gln	Ser	Leu	
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Glu	Met	Lys	Ser	Ser	Gly	Arg	Phe	His	Pro	Val	Tyr	Ala			
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 35 40 45  
 Leu Arg Ile His Ala Ile Leu Asp Lys Ala Glu Thr Arg Trp Asn His  
 50 55 60  
 Lys Asn Thr Ser Leu Val Glu Leu Val Arg Gln Leu Lys Asp Ala Ala  
 65 70 75 80  
 Tyr Asp Ala Glu Asp Leu Leu Glu Glu Leu Tyr Gln Ala Ala Lys  
 85 90 95  
 Gln Lys Val Glu His Arg Gly Asp Gln Ile Ser Asp Leu Phe Ser Phe  
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 Ser Leu Ser Thr Ala Ser Glu Trp Leu Gly Ala Asp Gly Asp Asp Ala  
 115 120 125  
 Gly Thr Arg Leu Arg Glu Ile Gln Gly Lys Leu Cys Asn Ile Ala Ala  
 130 135 140  
 Asp Met Met Asp Val Met Gln Leu Leu Ala Pro Asp Asp Gly Gly Arg  
 145 150 155 160  
 Gln Phe Asp Trp Lys Val Val Arg Arg Glu Thr Ser Ser Phe Leu Thr  
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 Glu Thr Val Val Phe Gly Arg Asp Gln Glu Arg Glu Lys Val Val Glu  
 180 185 190  
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 195 200 205  
 Leu Val Gly Ile Gly Gly Val Gly Lys Thr Thr Leu Ala Gln Leu Val  
 210 215 220  
 Tyr Asn Asp Asn Arg Val Gly Asn Tyr Phe His Leu Lys Val Trp Val

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				260											270		
	Leu	Gln	Gln	Ile	Leu	Lys	Glu	Lys	Ile	280	Ala	Ser	Glu	Arg	Phe	Leu	Leu
				275													
	Val	Leu	Asp	Asp	Val	Trp	Ser	Glu	Asn	295	Arg	Asp	Asp	Trp	Glu	Arg	Leu
	Cys	Ala	Pro	Leu	Arg	Phe	Ala	Ala	Arg	Gly	Ser	Lys	Val	Ile	Val	Thr	
	Thr	Arg	Asp	Thr	Lys	Ile	Ala	Ser	Ile	Ile	Gly	Thr	Met	Lys	Glu	Ile	
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	Ser	Thr	Thr	Arg	His	Leu	Ser	Val	Ala	Leu	Thr	Glu	Leu	Met	Lys	Leu	
	Val	Asp	Phe	Ser	Gly	Tyr	Asn	Lys	Leu	Arg	Thr	Leu	Met	Ile	Asn	Asn	
	Gln	Arg	Asn	Gln	Tyr	Pro	Tyr	Met	Thr	Lys	Val	Asn	Ser	Cys	Leu	Leu	
	Pro	His	Ser	Leu	Phe	Lys	Arg	Leu	Lys	Arg	Ile	His	Val	Leu	Val	Leu	
	Gln	Lys	Cys	Gly	Met	Lys	Glu	Leu	Pro	Asp	Ile	Ile	Gly	Asp	Leu	Ile	
	Gln	Leu	Arg	Tyr	Leu	Asp	Ile	Ser	Tyr	Asn	Ala	Cys	Ile	Gln	Arg	Leu	
	Pro	Glu	Ser	Leu	Cys	Asp	Leu	Tyr	Asn	Leu	Gln	Ala	Leu	Arg	Leu	Trp	
	Gly	Cys	Gln	Leu	Arg	Ser	Phe	Pro	Gln	Gly	Met	Ser	Lys	Leu	Ile	Asn	
	Leu	Arg	Gln	Leu	Arg	Val	Glu	Asp	Glu	Ile	Ser	Lys	Ile	Tyr	Glu		
	Val	Gly	Lys	Leu	Ile	Ser	Leu	Gln	Glu	Leu	Ser	Ala	Phe	Lys	Val	Leu	
	Asn	Asn	His	Gly	Asn	Lys	Leu	Ala	Glu	Leu	Ser	Gly	Leu	Thr	Gln	Leu	
	Arg	Ser	Thr	Leu	Arg	Ile	Thr	Asn	Leu	Glu	Asn	Val	Gly	Ser	Lys	Glu	
	Glu	Ala	Ser	Lys	Ala	Lys	Leu	His	Arg	Lys	Gln	Tyr	Leu	Glu	Ala	Leu	



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Glu Leu Glu Trp 740 Ala Ala Gly Gln Val 745 Ser Ser Ser Leu Glu His 750 Glu Leu  
 Leu Val Ser 755 Glu Glu Val Leu Leu 760 Gly Leu Gln Pro His 765 His Phe Leu  
 Lys Ser 770 Leu Thr Ile Arg Gly 775 Tyr Ser Gly Ala Thr 780 Val Pro Ser Trp  
 Leu Asp Val Lys Met Leu 790 Pro Asn Leu Gly Thr 795 Ile Gly Leu Pro His 800 Asn  
 Cys Thr Arg Leu Glu 805 Gly Leu Ser Tyr Ile 810 Gln Leu Pro His 815 Ser His  
 Lys Val Leu His 820 Met Lys Arg Met Pro 825 Val Val Lys Gln Met 830 Ser His  
 Glu Leu Cys 835 Gly Cys Thr Lys Ser 840 Lys Leu Phe Pro Arg 845 Leu Glu Glu  
 Leu Val Leu Glu Asp Met Pro 855 Thr Leu Lys Glu Phe 860 Asn Leu Ala  
 Gln Leu Pro Cys Leu Lys 870 Ile Ile His Met Lys 875 Asn Met Phe Ala Val 880  
 Lys His Ile Gly Arg 885 Glu Leu Tyr Gly Asp 890 Ile Glu Ser Asn Cys 895 Phe  
 Leu Ser Leu Glu 900 Glu Leu Val Leu Gln Asp Met Leu Thr Leu Glu Glu 910  
 Leu Pro Asn Leu Gly Gln Leu Pro 920 His Leu Lys Val Ile His Met Lys 925  
 Asn Met Ser Ala Leu Lys Leu 935 Ile Gly Arg Glu Leu 940 Cys Asp Ser Arg  
 Glu Lys Ile Trp Phe Pro Arg Leu Glu Val Leu 955 Val Leu Lys Asn Met 960  
 Leu Ala Leu Glu 965 Leu Pro Ser Leu Asp 970 Asn Phe Arg Val Ser Arg 975  
 Phe Phe Ala Ser 980 Ser Val Glu Val Gly 985 His Gly Leu Phe Ser Ala Thr 990  
 Arg Asn Lys 995 Trp Phe Pro Arg Leu Glu Glu Leu Glu 1005 Ile Lys Gly Met  
 Leu Thr Phe Glu Glu Leu His 1015 Ser Leu Glu Lys Leu Pro Cys Leu Lys 1020  
 Val Phe Arg Ile Lys Gly 1030 Leu Pro Ala Val Lys 1035 Lys Ile Gly His Gly 1040  
 Leu Phe Asp Ser Thr Cys Gln Arg Glu Cys 1050 Phe Pro Arg Leu Glu Asp 1055  
 Leu Val Leu Ser Asp Met Pro Ala Trp Glu Glu Trp Ser Trp Ala Glu 1070  
 Arg Glu Glu Leu Phe Ser Cys Leu 1080 Cys Arg Leu Lys Ile Glu Gln Cys 1085  
 Pro Lys Leu Lys Cys Leu Leu 1095 Pro Ile Pro His Ser Leu Ile Lys Leu 1100  
 Glu Leu Trp Gln Val Gly Leu Thr Gly Leu Pro Gly Leu Cys Lys Gly 1120  
 Ile Gly Gly Gly Ser Ser Thr Arg Thr Ala Ser Leu Ser Leu Leu His 1135  
 Ile Ile Lys Cys 1140 Pro Asn Leu Arg Asn Leu Gly Glu Gly Leu Leu Ser 1150  
 Asn His Leu Pro His Ile Asn Ala Ile Arg Ile Trp Glu Cys Ala Glu 1165  
 Leu Leu Trp Leu Pro Val Lys Arg Phe Arg Glu Phe Thr Thr Leu Glu 1180  
 Asn Leu Ser Ile Arg Asn Cys Pro Lys Leu Met Ser Met Thr Gln Cys 1200  
 Glu Glu Asn Asp Leu Leu Leu Pro Pro Leu Ile Lys Ala Leu Glu Leu 1215  
 Gly Asp Cys Gly Asn Leu Gly Lys Ser Leu Pro Gly Cys Leu His Asn 1230  
 Leu Ser Ser Leu Thr Gln Leu Ala Ile Ser Asn Cys Pro Tyr Met Val

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 1250 1255 1260  
 Arg Ile Glu Asn Cys Asp Gly Leu Gly Ser Ile Glu Gly Leu Gln Val  
 1265 1270 1275 1280  
 Leu Lys Ser Leu Lys Arg Leu Ala Ile Ile Gly Cys Pro Arg Leu Leu  
 1285 1290 1295  
 Leu Asn Glu Gly Asp Glu Gln Gly Glu Val Leu Ser Leu Leu Glu Leu  
 1300 1305 1310  
 Ser Val Asp Lys Thr Ala Leu Leu Lys Leu Ser Leu Ile Lys Asn Thr  
 1315 1320 1325  
 Leu Pro Phe Ile His Ser Leu Arg Ile Ile Trp Ser Pro Gln Lys Val  
 1330 1335 1340  
 Met Phe Asp Leu Glu Glu Gln Glu Leu Val His Ser Leu Thr Ala Leu  
 1345 1350 1355 1360  
 Arg Arg Leu Glu Phe Phe Arg Cys Lys Asn Leu Gln Ser Leu Pro Thr  
 1365 1370 1375  
 Glu Leu His Thr Leu Pro Ser Leu His Ala Leu Val Val Ser Asp Cys  
 1380 1385 1390  
 Pro Gln Ile Gln Ser Leu Pro Glu Lys Gly Leu Pro Thr Leu Leu Thr  
 1395 1400 1405  
 Asp Leu Gly Phe Asp His Cys His Pro Val Leu Thr Ala Gln Leu Glu  
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 Ala

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 <222> (1)..(3696)

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 gaa atc ttt aac cgg tcc atc aat ttg atc gtc gcg gaa ctg cgg ttg 96  
 Glu Ile Phe Asn Arg Ser Ile Asn Ile Val Ala Glu Leu Arg Leu  
 20 25 30 35  
 cag ttg aat gcg aga gcc gag ctg aac aat ctg cag aga aca cta ttg 144  
 Gln Leu Asn Ala Arg Ala Glu Leu Asn Asn Leu Gln Arg Thr Leu Leu  
 35 40 45 50  
 agg act cac tct ctg ctc gag gag gca aag gcg agg cgg atg act gac 192  
 Arg Thr His Ser Leu Leu Glu Glu Ala Lys Ala Arg Arg Met Thr Asp  
 50 55 60 65  
 aag tct ctc gtg ctg tgg ctg atg gag ctc aag gaa tgg gcc tac gac 240  
 Lys Ser Leu Val Leu Trp Leu Met Glu Leu Lys Glu Trp Ala Tyr Asp  
 65 70 75 80 85  
 gcc gac gac atc ctc gac gag tac gag gcc gca gca atc cga ctg aag 288  
 Ala Asp Asp Ile Leu Asp Glu Tyr Glu Ala Ala Ala Ile Arg Leu Lys  
 85 90 95

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gta Val	aca Thr	cg Arg	tcg Ser 100	acc Thr	ttc Phe	aaa Lys	cg Arg	ctt Leu 105	atc Ile	gat Asp	cat His	gtg Val	att Ile 110	ata Ile	aat Asn	336
gtt Val	cca Pro	tta Leu 115	gcg Ala	cac His	aaa Lys	gta Val	gca Ala 120	gac Asp	atc Ile	agg Arg	aaa Lys	agg Leu 125	ttg Leu	aac Asn	ggg Gly	384
gtc Val	act Thr 130	ctt Leu	gag Glu	agg Arg	gag Glu	cta Leu 135	aat Asn	ctg Leu	ggg Gly	gcg Ala	ctg Leu 140	gaa Glu	ggg Gly	tcg Ser	cag Gln	432
ccg Pro 145	ctt Leu	gat Asp	tcc Ser	acg Thr	aaa Lys 150	aga Arg	ggg Gly	gtg Val	acc Thr	act Thr 155	tct Ser	ctt Leu	ctg Leu	act Thr	gaa Glu 160	480
tct Ser	tgt Cys	att Ile	gtc Val	ggg Gly 165	cga Arg	gct Ala	caa Gln	gat Asp	aag Lys 170	gag Glu	aat Asn	ttg Leu	att Ile	cgg Arg 175	ttg Leu	528
ctg Leu	ttg Leu	gag Glu	ccc Pro 180	agc Ser	gat Asp	ggg Gly	gcg Ala	gtt Val 185	cct Pro	gtt Val	gtt Val	cct Pro	ata Ile 190	gtt Val	gga Gly	576
tta Leu	gga Gly	ggg Gly 195	gca Ala	ggg Gly	aag Lys	acg Thr	act Thr 200	ctg Leu	tct Ser	cag Gln	ctt Leu	atc Ile 205	ttt Phe	aat Asn	gac Asp	624
aag Lys	aga Arg 210	gtg Val	gag Glu	gag Glu	cat His	ttc Phe 215	cca Pro	ttg Leu	aga Arg	atg Met	tgg Trp 220	gtg Val	tgt Cys	gtg Val	tct Ser	672
gac Asp 225	gat Asp	ttt Phe	gat Asp	gtg Val	aag Lys 230	aga Arg	att Ile	act Thr	aga Arg	gag Glu 235	atc Ile	aca Thr	gag Glu	tac Tyr	gcc Ala 240	720
acc Thr	aac Asn	gga Gly	agg Arg	ttc Phe 245	atg Met	gat Asp	ctc Leu	acc Thr	aac Asn 250	ttg Leu	aat Met	atg Leu	ctt Leu	caa Gln 255	gtt Val	768
aat Asn	ctg Leu	aaa Lys	gag Glu 260	gag Glu	ata Ile	agg Arg	ggg Gly	acg Thr 265	aca Thr	ttt Phe	ttg Leu	ctt Leu	gtg Val 270	ctg Leu	gat Asp	816
gat Asp	gtg Val	tgg Trp 275	aac Asn	gaa Glu	gac Asp	ccc Pro	gtg Val 280	aag Lys	tgg Trp	gaa Glu	agc Ser	ctg Leu 285	tta Leu	gcc Ala	cca Pro	864
tta Leu	gat Asp 290	gcc Ala	gga Gly	gga Gly	cgg Arg	gga Gly 295	agc Ser	gtg Val	gtc Val	att Ile	gtg Val 300	acg Thr	aca Thr	cag Gln	agc Ser	912
aaa Lys 305	aag Lys	gtc Val	gcc Ala	gat Asp	gtc Val 310	acc Gly	ggc Gly	acg Thr	atg Met	gag Glu 315	cca Pro	tac Tyr	ggt Val	ctc Leu	gag Glu 320	960
gag Glu	tta Leu	acg Thr	gag Glu	gat Asp 325	gac Asp	agt Ser	tgg Trp	tca Ser	ctc Leu 330	atc Ile	gag Glu	agt Ser	cac His	tcc Ser 335	ttc Phe	1008
agg Arg	gag Glu	gcg Ala	agc Ser 340	tcg Cys	tct Ser	agt Ser	aca Thr	aat Asn 345	cct Pro	aga Arg	atg Met	gaa Glu	gag Glu 350	atc Ile	ggg Gly	1056

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gtc ttg gaa act gag act tgg gag atg cca ccg gct gca agt gat gtg Val Leu Glu Thr Glu Thr Trp Glu Met Pro Pro Ala Ala Ser Asp Val 385 390 395 400	1200
tta tcc gct cta agg aga agt tac gac aat cta ccc cct cag ctg aag Leu Ser Ala Leu Arg Arg Ser Tyr Asp Asn Leu Pro Pro Gln Leu Lys 405 410 415	1248
ctc tgt ttt gcc ttc tgt gct ctg ttt aca aag ggc tac agg ttt cga Leu Cys Phe Ala Phe Cys Ala Leu Phe Thr Lys Gly Tyr Arg Phe Arg 420 425 430	1296
aag gat aca ctg atc cac atg tgg ata gct caa aat ttg att caa tca Lys Asp Thr Leu Ile His Met Trp Ile Ala Gln Asn Leu Ile Gln Ser 435 440 445	1344
aca gag tcg aaa aga tcg gag gac atg gca gaa gaa tgc ttt gat gat Thr Glu Ser Lys Arg Ser Glu Asp Met Ala Glu Glu Cys Phe Asp Asp 450 455 460	1392
ttg gtg tgc aga ttc ttc ttt cgg tac tcc tgg ggc aac tat gtg atg Leu Val Cys Arg Phe Phe Phe Arg Tyr Ser Trp Trp Gly Asn Tyr Val Met 465 470 475 480	1440
aat gac tca gtc cat gac ctc gct cga tgg gtt tca ttg gat gaa tat Asn Asp Ser Val His Asp Leu Ala Arg Trp Val Ser Leu Asp Glu Tyr 485 490 495	1488
ttt cga gca gat gaa gac tca cca ttg cat att tca aag cca att cgt Phe Arg Ala Asp Glu Asp Ser Pro Leu His Ile Ser Lys Pro Ile Arg 500 505 510	1536
cat ttg tca tgg tgc agt gaa aga ata acc aat gtt ctt gag gat aat His Leu Ser Trp Cys Ser Glu Arg Ile Thr Asn Val Leu Glu Asp Asn 515 520 525	1584
aac act ggt gga gat gct gtc aat ccg ctc agc agt ttg cgc act ctc Asn Thr Gly Gly Asp Ala Val Asn Pro Leu Ser Ser Leu Arg Thr Leu 530 535 540	1632
ctt ttc tta gcc caa tct gag ttc cgg tcg tat cat ctt ctt gat aga Leu Phe Leu Gly Gln Ser Glu Phe Arg Ser Tyr His Leu Leu Asp Arg 545 550 555 560	1680
atg ttc agg atg ttg agc cga atc cgt gtt ttg gat ttc agc aac tgc Met Phe Arg Met Leu Ser Arg Ile Arg Val Leu Asp Phe Ser Asn Cys 565 570 575	1728
gtc ata aga aat ttg cct tct tcg gtt gga aat ctg aaa cat ctg cgt Val Ile Arg Asn Leu Pro Ser Ser Val Gly Asn Leu Lys His Leu Arg 580 585 590	1776
tac ctg ggc ctg tct aat acg aga att caa agg ttg ccg gag tct gta Tyr Leu Gly Leu Ser Asn Thr Arg Ile Gln Arg Leu Pro Glu Ser Val 595 600 605 610	1824

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595										600										605														
aca	cgt	ctt	tgc	ctc	ctt	cag	aca	ttg	cta	cta	gag	ggc	tgt	gaa	ctg	1872	Thr	Arg	Leu	Cys	Leu	Leu	Gln	Thr	Leu	Leu	Leu	Gly	Cys	Glu	Leu			
	610					615					620																							
tgc	agg	tta	cca	aga	agc	atg	agc	agg	ctc	gtc	aaa	ctg	agg	cag	ctc	1920	Arg	Leu	Pro	Arg	Ser	Met	Ser	Arg	Leu	Val	Lys	Leu	Arg	Gln	Leu			
	625					630					635																							
aaa	gca	aat	cca	gat	gta	att	gcc	gac	ata	gcc	aaa	gtc	ggg	aga	ttg	1968	Lys	Ala	Asn	Pro	Asp	Val	Ile	Ala	Asp	Ile	Ala	Lys	Val	Gly	Arg	Leu		
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cca	tgt	ctc	ggg	cag	ctg	cat	atc	ctt	aga	cat	ttg	cac	atc	gat	ggg	2400	Pro	Cys	Leu	Gly	Gln	His	Leu	His	Arg	His	Leu	His	Ile	Asp	Gly	Leu		
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Arg	Leu	His	Lys	Leu	Leu	Ile	Glu	Asp	Cys	Pro	Arg	Leu	Arg	Asn	Leu	
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Pro	Ser	Leu	Pro	Pro	Thr	Leu	Glu	Glu	Leu	Arg	Ile	Ser	Arg	Thr	Gly	
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cta	gtt	gat	ctt	cca	gga	ttc	cat	gga	aac	ggt	gat	gtg	acg	acg	aat	2688
Leu	Val	Asp	Leu	Pro	Gly	Phe	His	Gly	Asn	Gly	Asp	Val	Thr	Thr	Asn	
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Val	Ser	Leu	Ser	Ser	Leu	His	Val	Ser	Glu	Cys	Arg	Glu	Leu	Arg	Ser	
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Leu	Ser	Glu	Gly	Leu	Leu	Gln	His	Asn	Leu	Val	Ala	Leu	Lys	Thr	Ala	
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Ala	Phe	Thr	Asp	Cys	Asp	Ser	Leu	Glu	Phe	Leu	Pro	Ala	Glu	Gly	Phe	
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Pro	Cys	Ser	Phe	Leu	Leu	Pro	Ser	Ser	Leu	Glu	His	Leu	Lys	Leu	Gln	
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cca	tgc	ctc	tat	cca	aac	aac	aat	gag	gat	tca	ctg	tca	aca	tgc	ttc	2976
Pro	Cys	Leu	Tyr	Pro	Asn	Asn	Asn	Glu	Asp	Ser	Leu	Ser	Thr	Cys	Phe	
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Glu	Asn	Leu	Thr	Ser	Leu	Ser	Phe	Leu	Asp	Ile	Lys	Asp	Cys	Pro	Asn	
		995					1000					1005				
ctg	tca	tca	ttt	cca	ccg	ggt	cct	cta	tgt	cag	cta	tca	gca	ctc		3069
Leu	Ser	Ser	Phe	Pro	Pro	Gly	Pro	Leu	Cys	Gln	Leu	Ser	Ala	Leu		
		1010				1015					1020					
caa	cat	ttg	tcc	ctc	gtc	aat	tgc	cag	agg	cta	caa	tct	att	ggc		3114
Gln	His	Leu	Ser	Leu	Val	Asn	Cys	Gln	Arg	Leu	Gln	Ser	Ile	Gly		
	1025					1030					1035					
ttc	cag	gca	ctc	acc	tcc	ctc	gaa	agc	ttg	aca	att	cag	aac	tgc		3159
Phe	Gln	Ala	Leu	Thr	Ser	Leu	Glu	Ser	Leu	Thr	Ile	Gln	Asn	Cys		
	1040					1045					1050					
cct	cgc	ctc	acc	atg	tca	cac	agt	ttg	gtt	gag	gtg	aat	aac	tct		3204
Pro	Arg	Leu	Thr	Met	Ser	His	Ser	Leu	Val	Glu	Val	Asn	Asn	Ser		
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tcc	gat	aca	ggg	ctc	gcg	ttt	aat	atc	act	cga	tgg	atg	cgc	aga		3249
Ser	Asp	Thr	Gly	Leu	Ala	Phe	Asn	Ile	Thr	Arg	Trp	Met	Arg	Arg		
	1070					1075					1080					
cga	aca	ggt	gac	gac	ggc	ttg	atg	ctc	aga	cac	cga	gca	caa	aat		3294
Arg	Thr	Gly	Asp	Asp	Gly	Leu	Met	Leu	Arg	His	Arg	Ala	Gln	Asn		
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Asp Ser 1100 Phe Phe Gly Gly Leu 1105 Leu Gln His Leu Thr 1110 Phe Leu Gln	
ttt cta aag atc tgc cag tgt cca caa ctc gta acc ttc acc ggc	3384
Phe Leu 1115 Lys Ile Cys Gln Cys 1120 Pro Gln Leu Val Thr 1125 Phe Thr Gly	
gaa gag gaa gag aag tgg aga aac ctt act tct ctt caa att ctg	3429
Glu Glu 1130 Glu Glu Lys Trp Arg 1135 Asn Leu Thr Ser Leu 1140 Gln Ile Leu	
cac atc gtt gat tgt cca aac ctg gag gta ctg cct gca aac ttg	3474
His Ile 1145 Val Asp Cys Pro Asn 1150 Leu Glu Val Leu Pro 1155 Ala Asn Leu	
caa agc ctc tgc tcc ctc agc acc ttg tac atc gtc aga tgc cca	3519
Gln Ser 1160 Leu Cys Ser Leu Ser 1165 Thr Leu Tyr Ile Val 1170 Arg Cys Pro	
aga atc cat gcg ttt cct ccc gga ggt gtc agc atg tcc ctg gca	3564
Arg Ile 1175 His Ala Phe Pro Pro 1180 Gly Gly Val Ser Met 1185 Ser Leu Ala	
cat ttg gtc atc cat gaa tgc cct cag ctg tgt cag cga tgt gat	3609
His Leu 1190 Val Ile His Glu Cys 1195 Pro Gln Leu Cys Gln 1200 Arg Cys Asp	
cca ccg gga ggt gat gat tgg ccc tta ata gct aat gta cca aga	3654
Pro Pro 1205 Gly Gly Asp Asp Trp 1210 Pro Leu Ile Ala Asn 1215 Val Pro Arg	
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Arg Thr His Ser Leu Leu Glu Glu Ala Lys Ala Arg Arg Met Thr Asp	
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Lys Ser Leu Val Leu Trp Leu Met Glu Leu Lys Glu Trp Ala Tyr Asp	
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Val Thr Arg Ser Thr Phe Lys Arg Leu Ile Asp His Val Ile Ile Asn	
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Val Pro Leu Ala His Lys Val Ala Asp Ile Arg Lys Arg Leu Asn Gly	
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## 7084167\_1.TXT

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 195 200 205  
 Lys Arg Val Glu Glu His Phe Pro Leu Arg Met Trp Cys Val Ser  
 210 215 220  
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Arg	Leu	His	Lys	Leu	Leu	Ile	Glu	Asp	Cys	Pro	Arg	Leu	Arg	Asn	Leu		
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Ala	Phe	Thr	Asp	Cys	Asp	Ser	Leu	Glu	Phe	Leu	Pro	Ala	Glu	Gly	Phe		
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Arg	Thr	Ala	Ile	Ser	Leu	Glu	Ser	Leu	Ile	Met	Thr	Asn	Cys	Pro	Leu		
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## 7084167\_1.TXT

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20 25 30
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&lt;223&gt; Xaa = Tyr, Val, Ile, Leu, Met, Phe, Trp

&lt;400&gt; 7

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Leu Xaa Xaa Xaa Xaa Phe Xaa Xaa Leu Xaa Arg Ile Xaa Val Leu Xaa
1      5      10      15
Xaa Xaa Xaa Cys Xaa Xaa Xaa Leu Pro Xaa Xaa Xaa Gly Xaa Leu
20      25      30
Xaa Xaa Leu Arg Tyr Leu Xaa Xaa Ser Xaa Asn Xaa Xaa Ile Gln Arg
35      40      45
Leu Pro Glu Ser Xaa Xaa Xaa Leu Xaa Leu Gln Xaa Leu Xaa Leu
50      55      60
Xaa Gly Cys Xaa Leu Xaa Xaa Xaa Pro Xaa Xaa Met Ser Xaa Leu Xaa
65      70      75      80
Xaa Leu Arg Gln Leu Xaa Xaa Xaa Xaa Xaa Ile Xaa Xaa Ile Xaa
85      90      95
Xaa Val Gly Xaa Leu Ile Xaa Leu Gln Glu Leu Xaa Ala Xaa Xaa Val
100      105      110
Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa Ala Glu Leu Ser Xaa Xaa Xaa Gln
115      120      125
Leu Xaa Xaa Xaa Leu Xaa Ile Xaa Asn Leu Xaa Asn Val Xaa Xaa Xaa
130      135      140
Xaa Glu Xaa Xaa Lys Ala Xaa Leu Xaa Xaa Lys Gln Xaa Leu Xaa Xaa
145      150      155      160
Leu Xaa Leu Xaa Trp Ala Xaa Gly Xaa Xaa Xaa Xaa Xaa Xaa Glu
165      170      175
Xaa Xaa Xaa Xaa Xaa Xaa Val Leu Xaa Gly Leu Xaa Pro His Xaa Xaa
180      185      190
Leu Xaa Xaa Leu Xaa Ile Xaa Xaa Tyr Xaa Gly Xaa Xaa Xaa Pro Ser
195      200      205
Trp Xaa Xaa Xaa Xaa Xaa Leu Pro Asn Xaa Xaa Thr Xaa Xaa Leu Xaa
210      215      220
Xaa Cys Xaa Arg Leu Xaa Xaa Leu Xaa Xaa Xaa Gly Gln Leu Xaa Xaa
225      230      235      240
Leu Xaa Xaa Leu His Xaa Xaa Xaa Met Xaa Xaa Val Xaa Gln Xaa Xaa
245      250      255
Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Xaa Xaa Phe Pro Xaa Leu Glu
260      265      270
Xaa Leu Xaa Xaa Xaa Xaa Met Pro Xaa Leu Xaa Glu Xaa
275      280      285

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